

CTH D Bridge
Spanning Eau Galle River on CTH D
Eau Galle Vicinity
Dunn County
Wisconsin

HAER No. WI-100 HAER
WIS
17-EAGALY,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Great Lakes System Office
1709 Jackson Street
Omaha, Nebraska 68102-2571

HISTORIC AMERICAN ENGINEERING RECORD

CTH D BRIDGE

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Location: CTH D over the Eau Galle River
Eau Galle, Dunn County, Wisconsin

USGS Arkansaw Quadrangle, Universal Transverse Mercator Coordinates:
Zone 15 Easting 578390 Northing 4949000

Present Owner: Dunn County

Present Use: Vehicular bridge

Significance: The CTH D Bridge is a single-span, Parker through truss designed by the State Highway Commission and erected in 1934-1935 by the Worden-Allen Company of Milwaukee, Wisconsin. Although not identified as a significant structure in *Cultural Resource Management in Wisconsin* (the state's cultural resource management plan), the bridge is one of approximately thirty-five Parker trusses identified by the state's Historic Bridge Advisory Committee in the early 1980s. Fewer than twenty of these bridges remain today. As well, *Cultural Resource Management* identifies the Worden-Allen Company as a prolific bridge builder in the state.¹ With its integrity largely intact, the CTH D Bridge is significant as a good and increasingly rare example of a Parker truss that was built by a prominent Wisconsin bridge-building company.

PART I. HISTORICAL INFORMATION**A. Physical History:**

1. Date of erection: 1934-1935.²
2. Architect: State Highway Commission of Wisconsin.
3. Original and subsequent owners: Public ownership.

¹Barbara Wyatt, ed., *Cultural Resource Management in Wisconsin*, Vol. 2 (Madison: State Historical Society of Wisconsin, Historic Preservation Division, 1986), Transportation, 12/9, 12/23.

²"New Bridge Under Construction," *The Durand (Wis.) Courier-Wedge*, 31 January 1935, 1; *Official Proceedings of the Board of Supervisors of Dunn County, Wisconsin, Special Session 15 March 1935* (Dunn County, WI: n.p., 1935), 11, 14; *Official Proceedings of the Board of Supervisors of Dunn County, Wisconsin, Special Session 25 July 1935*, 7-8.

4. Builder: Worden-Allen Company.³
5. Alterations and additions: The historical integrity of this structure is generally good, although its vertical clearance was increased by modifying the placement of the portal and sway bracing.

B. Historical Context:

DUNN COUNTY AND EAU GALLE HISTORY

Dunn County was organized in 1854, a time when the lumber industry was becoming a dominant economic activity in northern Wisconsin. Included within the Chippewa River Flowage, Dunn County is in a portion of the state that produced 60,000,000 feet of lumber in 1860-1861, a number that jumped to 285,000,000 in 1868-1869 and to 436,000,000 feet in 1871-1872. Clearly prospering in the last half of the nineteenth century, the lumber industry generally declined in the region around 1900 as pine supplies became exhausted. A vast cut-over was one of the legacies the lumbermen left the area. Soon thereafter, however, aspiring agriculturalists were attracted to the vicinity, and farms quickly began to dot the landscape. Of the county's 545,329 acres, only 158,581 were devoted to farming in 1870. But by 1890, there were 2,714 farms occupying 339,384 acres, and in 1910, there were 3,515 farms utilizing 464,604 acres.⁴

In the hey-day of the lumber industry and with the rise of agriculture, there was the need for trade centers. This was the context of the community of Eau Galle. Located in southwestern Dunn County on the Eau Galle River, this small, rural center helped sustain loggers and farmers alike.

Large tracts of lumber lured white men into the Eau Galle area. Among them was N.S. Manning, who arrived in 1835. Recently discharged from the military, Manning had initially explored this region during his tour of duty to locate lumber for construction of military posts. But it was not until 1838 that more extensive white

³"New Bridge," *The Durand Courier-Wedge*.

⁴*History of Northern Wisconsin* (Chicago: Western Historical Company, 1881), 272-93; *History of Dunn County, Wisconsin* (Minneapolis: H.C. Cooper, Jr. & Co., 1925), 28; *Dunn County History* (Dunn County, WI: Dunn County Historical Society, 1984), 5; Frederick Merk, *Economic History of Wisconsin During the Civil War Decade* (Madison: State Historical Society of Wisconsin, 1916; 2nd ed., 1971), 66; Robert Fries, *Empire in Pine: The Story of Lumbering in Wisconsin 1830-1900* (Madison: State Historical Society of Wisconsin, 1951); *State of Wisconsin: 1995-1996 Blue Book* (Madison: State of Wisconsin, 1995), 672; *A Century of Wisconsin Agriculture, 1848-1948* (Madison: Wisconsin Crop and Livestock Reporting Service, 1948), 87.

settlement began. In that year, a dam had been built across the Eau Galle River. Subsequently, West Point graduate Captain George Wales, Thomas Savage and a millwright named Captain Dix started a sawmill in 1839.⁵ The mill changed hands several times, but it proved to be a mainstay of Eau Galle's business community. Canadian William Carson and New Englander Henry Eaton became partners in the venture shortly after it commenced, and by 1844, they were the primary owners. In 1852, Eldridge Rand of Burlington, Iowa, bought an interest in the concern. That same year, the company built a large steam mill, which fire destroyed in 1860. Undaunted, the owners immediately rebuilt the mill.⁶

By the mid-1870s, the lumber supply on the Eau Galle River dwindled to the point that the mill company, then known as Carson & Rand, began to diversify operations. The proprietors discontinued the sawmill but managed a flour mill and general store.⁷ This shift was an indication that agriculture was becoming increasingly important for the area's economy, offsetting the lumber industry's decline. Evidence of the trend is apparent in the 1879 *Wisconsin State Gazetteer and Business Directory*, which notes that Eau Galle's primary resources were "lumber and farm products." But despite this claim, the only lumber-related business listed is Carson & Rand. The village's other enterprises were more oriented toward servicing the surrounding agricultural community. For example, among Eau Galle's 250 inhabitants, there were three blacksmiths, a land agent, two general stores and Carson & Rand's flour mill.⁸

In the mid-1890s, the community's population dipped to a hundred residents as the village was entirely devoid of any lumber-related establishments. By that time, Carson & Rand operated a general store and a creamery. The village also included another general store, a blacksmith, a meat market and two wagon-making enterprises. The Carson & Rand concern continued until fire destroyed the flour mill in 1897. The enterprise officially closed its doors the following year, creating a significant void in Eau Galle's business activity. Shortly after the turn-of-the-century, Eau Galle numbered three hundred citizens, and its business sector expanded

⁵*History of Dunn County*, 17, 210; *History of Northern Wisconsin*, 291; *Dunn County History*, 23. Another account states that the mill was built in 1840. See Bella French, ed., *The American Sketch Book, Menomonee and Dunn County, Wisconsin* (La Crosse, WI: Sketch Book Company, 1875), 290.

⁶French, *American Sketch Book*, 290; *History of Dunn County*, 17, 210, 671; *History of Northern Wisconsin*, 291.

⁷*History of Dunn County*, 18, 671. Although this source indicates that the sawmill closed down, subsequent business directories list the Carson & Rand sawmill as late as 1888-1889. See *Wisconsin State Gazetteer and Business Directory, 1888-1889* (Chicago: R.L. Polk & Co., 1888), 303.

⁸*Wisconsin State Gazetteer and Business Directory, 1879* (Milwaukee: William Hogg, 1879), 155-56.

to include Tanner & Webb's flour/feed mill and a farm implement dealer. Over the next two decades, however, the small, agriculturally-oriented village changed very little. Its population fluctuated between two hundred and three hundred residents; by 1927, it decreased to 175, while commerce continued to center entirely around the area's farming community.⁹

The CTH D Bridge evolved within this general historical context to provide access across the Eau Galle River.

TRUSS BRIDGES IN WISCONSIN

The two most commonly found types of truss bridges are the Pratt and Warren. These two classifications are further subdivided into pony or low trusses, overhead or through trusses and deck trusses. The Warren truss, which two British engineers patented in 1840, placed nominal stress on the vertical members, while the diagonals served as both tension and compression members. Caleb and Thomas Pratt patented the Pratt truss in 1844, incorporating vertical compression members and diagonal tension members. During the nineteenth century, the Pratt truss seemed to be more popular because it used less iron and was easier to erect. In the 1870s, numerous variations in the Pratt design were introduced for long-span bridges. To save money and material, engineers "bent" the top chord into a polygonal configuration, thereby creating a Parker truss. If the top chord had exactly five sides, it was called a "camelback" truss. The increased live loads of railroad locomotives and rolling stock necessitated further design innovations. The addition of subtrusses and/or subties greatly fortified truss bridges and transformed a Pratt into a Baltimore and a Parker into a Pennsylvania truss--the latter considered a "major advance in strengthening the Pratt truss." Another development which sparked much debate around the turn-of-the-century involved the merits of pin connections versus riveted connections for main truss members. Proponents of riveted bridges cited the advantages of increased structural rigidity and the reduction of damaging vibrations; advocates of pin-connected bridges emphasized the theoretically correct stress distribution and the smaller amount of required metal. Although no dramatic resolution occurred, a compromise of sorts was reached in the early twentieth century. Riveted bridges were designed with less duplication of members, and pin-connected bridges, suitably detailed, were still accepted for long-span highway bridges.¹⁰

⁹*History of Dunn County*, 211; *Wisconsin State Gazetteer and Business Directory, 1895-1896* (Chicago: R.L. Polk & Co., 1895), 295; *Polk's Wisconsin State Gazetteer and Business Directory, 1903-1904* (Chicago: R.L. Polk & Co., 1903), 344; *Polk's Wisconsin State Gazetteer and Business Directory, 1927-1928* (Detroit: R.L. Polk & Co., 1927), 257.

¹⁰Jeffrey Hess, Robert M. Frame, III, Robert S. Newbery and John N. Vogel, "Bowen Mill Bridge," *Historic American Engineering Record (HAER) Report*, HAER No. WI-67 (1992): 3-5. On file at the Library of Congress,

These developments affected Wisconsin bridge construction, but other circumstances were equally important. Until the latter nineteenth century, individual bridge companies were largely responsible for bridge design. Consequently, there was little-- if any--standardization of design, although Pratt truss bridges seemed to predominate. Indeed, the state's oldest truss bridge, the 1877 White River Bridge in Burlington, is a Pratt. The Good Roads Movement of the late 1890s and early 1900s, however, prompted a dramatic shift regarding bridge design by promoting greater involvement on the part of local officials and, especially, the state government. In 1907, the state legislature established a Highway Division with the Wisconsin Geological and Natural History Survey to conduct experiments in road design and to provide professional advice to local governments about specific projects.¹¹

The following year, Wisconsin voters overwhelmingly removed the greatest obstacle to creating a progressive statewide system of bridge and highway construction by eliminating the state's constitutional prohibition against direct state aid to transportation projects. In 1911, the legislature made its first appropriation for highway improvements. In addition, it transformed the Highway Division into an autonomous State Highway Commission (SHC), responsible for overseeing the expenditure of state funds for the development of a state highway network.¹²

The SHC emphasized the use of standardized plans for various types of bridges and culverts. Prior to this time, metal truss bridges dominated crossings of all lengths. After 1911, however, the SHC promoted the construction of girder, beam or slab spans of steel and/or concrete for short crossings (less than thirty-five feet). The SHC particularly favored concrete spans, citing the advantages of lower cost, greater compatibility with aesthetic treatment and greater adaptability to remodeling, especially in terms of roadway widening. Despite its predilection for concrete bridges, the SHC continued to design truss bridges for spans of thirty-six feet or more. The riveted Warren became the state's standard pony design. Indeed, this design became the state's most common type of highway truss bridge. Of the approximately 450 Warren trusses in the state in 1980, over four-fifths were riveted pony trusses built according to SHC standard plans. The SHC also drafted a standard plan for riveted, overhead Pratt trusses. In the first three and one-half years of its work, the SHC designed over fifteen hundred bridges of all types. Practically all the local bridges in the state during these years were either designed by the SHC or were based on SHC standard plans. The SHC continuously revised its truss designs,

Washington, D.C.

¹¹Ibid., 5-6.

¹²Ibid., 7.

drawing upon the latest engineering information. In the 1930s, the SHC made a major commitment to keep its standardized plans up to date by dropping the Pratt design in favor of the Warren for all overhead truss configurations. Although concrete designs eventually dominated bridge construction, metal truss bridges remained cost-effective in many situations. Consequently, the SHC continued to design truss bridges until well after World War II.¹³

The number of highway truss bridges in Wisconsin has dwindled substantially over the years. Under the sponsorship of the State Historic Preservation Office (SHPO) of the State Historical Society, George Danko initiated the first systematic study of Wisconsin truss bridges in 1976. By 1980, when WisDOT established the Historic Bridge Advisory Committee (HBAC), seventeen bridges had been listed or found eligible for listing on the National Register of Historic Places. The HBAC pursued the statewide inventory of truss bridges, which then accounted for approximately one-tenth of the state's 10,386 surviving highway bridges built before 1950.¹⁴

The HBAC identified an initial pool of 996 pre-1941 truss bridges that represented seventeen structural types. The HBAC screened this pool to identify the following for each truss type: those bridges which had the earliest known construction dates; those in the best condition; bridges with the best available historical data; and those with the most noteworthy features. Also considering bridges in park settings, this winnowing process reduced the initial pool to 247. The most significant bridges within each truss category were determined by applying criteria--modified as necessary--that were developed in a Virginia study. The evaluation process yielded a final group of fifty-three bridges deemed potentially eligible for the National Register. Historians Jeffrey A. Hess and Robert M. Frame, III, contracted to complete a field survey and compile historical data for those bridges in 1986. The final survey totaled fifty-four bridges, including two already listed on the National Register (P-18-720 and P-53-162).¹⁵

CTH D BRIDGE:

It is likely that a river crossing at Eau Galle has existed since the early days of settlement; moreover, historical plats appear to indicate that the original location was at the site of the present-day bridge across the Eau Galle River. Indeed, by 1859, a bridge was in place in the southeast part of the village, where St. Henry's Catholic

¹³Ibid., 7-8.

¹⁴Ibid., 8-9.

¹⁵Ibid., 9-10.

Church was first built "close to the bridge."¹⁶ As well, that circa 1859 bridge was likely the one crossed by Caddie Woodlawn's father as he made periodic trips from his home in Dunnville to the Eau Galle mill in the 1860s. How long that first bridge survived is unknown. But seventy-five years later, in April 1934, melting snow and rain washed away the top of the dam at Eau Galle. This unleashed flood waters down the river and destroyed the bridge, which by then carried County Trunk Highway D. Undoubtedly because the bridge provided the only way for those on the east side of the river to reach their local trade center, a make-shift bridge had been opened within weeks.¹⁷

In May, the Dunn County Board voted to absorb 20 percent of the funds needed to repair the flood damage. In addition, the board encouraged the State Highway Commission to use money slated for the State Trunk System to help with the repairs. Later in the year, piers for a new bridge were put in place. Subsequently, in January 1935, work on the bridge began in earnest. The Worden-Allen Company of Milwaukee won the contract for the project.¹⁸

Established in 1901 and incorporated in 1902, the Worden-Allen Company was founded by Beverly L. Worden and Clarence J. Allen. Worden was educated as an engineer and in 1893, received a degree in civil engineering from the University of Wisconsin. Thereafter, he identified himself as a civil engineer until 1895, as a bridge engineer in 1896 and as a construction engineer from 1896 to 1902. It was in that latter capacity that Worden is believed to have worked for the Wisconsin Bridge and Iron Company until the turn-of-the-century. Mr. Allen, on the other hand, is known to have been associated with the company from its founding to 1907--a period in which he served as the firm's secretary-treasurer.¹⁹

¹⁶*History of Dunn County*, 212; *Dunn County History*, 23. The bridge across the Eau Galle River is indicated on early maps of the area. See *Atlas of the State of Wisconsin* (Boston: Walling, Tackabury & Co., 1876), 52; *Map of Dunn County, Wisconsin* (Milwaukee: Nash & Morgan, 1877); *Plat Book of Dunn County, Wisconsin* (Minneapolis: C.M. Foote & Co., 1888), 12, 20.

¹⁷John Russell, telephone conversation with John N. Vogel, 16 February 1995; Carol Ryrie Brink, *Coddie Woodlawn* (New York: MacMillan, 1935; Aladdin Books, 1990), 72, 84, 251, 256; "Plenty of Snow and High Water," *The Durand Courier-Wedge*, 5 April 1934, 1; "Wisconsin Floods Wreck, Isolate Bridges," *The Durand Courier-Wedge*, 12 April 1934, 1; "Eau Galle," *The Durand Courier-Wedge*, 19 April 1934, 3.

¹⁸*Official Proceedings of the Board of Supervisors of Dunn County, Wisconsin, Special Sessions 20 March, 1 May 1934* (Dunn County, WI: n.p., 1934), 1 May 1934, 7; "New Bridge," *The Durand Courier-Wedge*.

¹⁹Jeffrey Hess, Robert M. Frame, III, Robert S. Newbery and John N. Vogel, "Chippewa River Bridge," *Historic American Engineering Record (HAER) Report*, HAER No. 69 (1993): 8-9. On file at the Library of Congress, Washington, D.C.

The Worden-Allen Company was innovative and grew steadily. It erected the first known riveted Pratt overhead truss in Wisconsin in 1909. Shortly thereafter, in 1911, the firm's annual income surpassed \$1,000,000. And by 1915, Worden-Allen claimed offices in Chicago, Milwaukee, Buffalo, New York City and Houghton, Michigan. Growth was also facilitated by the 1909 founding of the Lackawanna Bridge Company, a Worden-Allen subsidiary. Given the extent of its operations, the affiliate enabled Worden-Allen to pursue other types of construction projects. In 1921, for instance, an advertisement identified Lackawanna as "General Contractors for Fireproof Construction."²⁰

The Worden-Allen Company, which constructed bridges in Wisconsin well into the 1930s, was identified by *Cultural Resource Management in Wisconsin* as a "known prolific Wisconsin [bridge] builder." In addition to the CTH D Bridge in Eau Galle, examples of other structures erected by the company have included the Wagon Trail Road Bridge over the Eau Galle River (1909), Blomberg Road Bridge over the Chippewa River (1914), STH 35 Bridge over the Chippewa River (1933) and CTH E Bridge over Elk Creek (1934).²¹

Upon award of the Eau Galle contract, Foreman C. Rasmussen and a crew of twenty-five workers began construction. The steel and concrete structure was projected to be 180 feet long and 26 feet wide and was scheduled for completion by July 1935. To help with the financing, the State Commission and County Board worked out an arrangement whereby the county agreed to assume maintenance of the bridge while the state would receive funds under Section 204 of the National Industrial Recovery Act. The bridge was presumably completed on time, at a cost of nearly \$20,000.²²

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The CTH D Bridge was built in 1934-1935. It is a single-span, Parker through truss with eleven panels.

²⁰Ibid.

²¹Wyatt, *Cultural Resource Management in Wisconsin*, Vol. 2, Transportation 12/14-16.

²²"New Bridge," *The Durand Courier-Wedge*; *Official Proceedings*, 15 March 1935, 11, 14; *Official Proceedings*, 25 July 1935, 7-8. It is presumed that the bridge was completed around July, although no official statement was found in the *Proceedings* or July issues of *The Durand Courier-Wedge*.

2. Condition of fabric: The historic fabric of this structure is generally good; however, its vertical clearance was increased by modifying the placement of the portal and sway bracing.

B. Description:

The CTH D Bridge, which rests on two concrete abutments, is 180 feet long and carries a 25 foot-wide traffic deck. The deck is carried by twelve floor beams, the end ones of which are 27 inch by 10 inch "I" beams; all intermediate elements are 30 inch by 10 1/2 inch "I" beams. Perpendicular to the floor beams are seven deck stringers, each of which is a 16 inch by 7 1/4 inch "I" beam. The bottom lateral bracing is comprised of 4 inch by 3 1/2 inch angles. The deck itself is concrete.

The floor beams, with the exception of those at the ends, are hung from 9 3/4 inch by 8 inch "I" beam hip and intermediate verticals. The inclined endposts, as well as the top chords, are 18 inches by 12 1/2 inches. Each is two channels, connected with lacing and coverplates. Top lateral bracing is comprised of 3 inch by 2 1/2 inch angles with lacing. Portal struts and portal bracing are fabricated from single-laced, 3 inch by 2 1/2 inch angles. The top struts and the lower chords of the associated sway bracing are built from paired, back-to-back, 5 inch by 3 inch, single-laced angles. The sway bracing is completed with 3 inch by 2 1/2 inch angles.

The diagonals in all panels are 9 3/4 inch by 8 inch "I" beams. Panels three through nine also have intermediate chords of 2 3/4 inch by 10 inch channels. The lower chords are paired, 12 inch by 3 inch channels, placed back-to-back and connected with regularly placed plates.

All major connections are riveted.

The bridge has no ornamentation, although a railing is located on each side of the traffic deck. It utilizes an 8 inch by 2 1/2 inch lower guard beam, a top chord that is 40 1/2 inches above the deck and comprised of a 3 inch by 2 1/2 inch angle, and lacing consisting of 1 1/2 inch by 1/4 inch bars.²³

C. Setting:

The bridge is located in the Town of Eau Galle, immediately southeast of the community of Eau Galle, at that point where CTH D crosses the Eau Galle River.

²³This description is based upon an inspection of the bridge, as well as the Bridge Plans, photocopies of which are in possession of Heritage Research, Ltd., Menomonee Falls, WI.

Spanning an approximately 30 foot-deep gorge, the bridge is oriented on a northwest/southeast axis. Beyond the community, the Eau Galle mill pond is about 2,000 feet northwest of the bridge. The balance of the area around the structure is largely rural, although several houses are located along CTH D to the southeast.

PART III. SOURCES OF INFORMATION

A. Bibliography:

1. Primary or unpublished sources:

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Bridge Plans. Photocopy at Heritage Research, Ltd., Menomonee Falls, WI.

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PART IV. PROJECT INFORMATION

This project has been sponsored by the Wisconsin Department of Transportation. Short, Elliot, Hendrickson, consulting engineers in Chippewa Falls, Wisconsin, formally acted as the contracting agency. The project was directed by Dr. John N. Vogel, Principal Investigator and Sr. Historian for Heritage Research, Ltd. (HRL), who provided the photographic documentation and the architectural/technical data. He also edited and prepared the final document. The general truss bridge context, as well as the information on the Worden-Allen Company, was originally prepared by Jeffrey Hess, Robert Frame, III, and Robert Newbery in a report for the Wisconsin Department of Transportation. That context was edited and summarized by Dr. Kevin Abing, who also prepared the local contextual information. Leah K. Vogel assisted during the photographic activities associated with this project.

